



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **94109525.9**

(51) Int. Cl.⁶: **B65D 77/22, B65D 51/16**

(22) Date of filing: **21.06.94**

(30) Priority: **23.12.93 IT MI932721**

(43) Date of publication of application:
28.06.95 Bulletin 95/26

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB IT LI LU NL PT SE

(71) Applicant: **Goglio, Luigi**
Via Frua, 11
I-20146 Milano (IT)

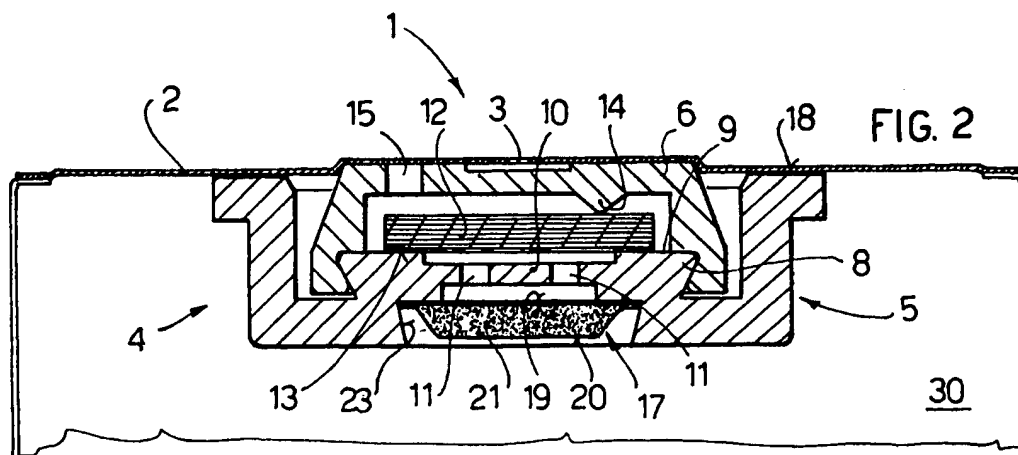
(72) Inventor: **Goglio, Luigi**
Via Frua, 11
I-20146 Milano (IT)

(74) Representative: **Petruzzello, Aldo et al**
Dr. Ing. A. Racheli & C.srl.
Viale San Michele del Carso, 4
I-20144 Milano (IT)

(54) **Degassing valve for aromatic products, such as coffee and similar products.**

(57) A one-way degassing valve (4) for aromatic products, such as coffee and the like, comprising a valve body (5,6), a valve element (12) and a selective type filter (17, 170), preferably consisting of

activated charcoal which allows the passage of low molecular weight gases, such as carbon dioxide, and retains the high molecular weight gases that constitute the product's aroma.



EP 0 659 657 A1

The present invention relates to a valve for aromatic products, or products that develop fragrant gases, particularly powder-like products such as coffee and the like, packaged in air-tight containers. Specific reference will be made hereafter to coffee, it being understood that what is said applies in general to all those products that develop fragrant gases.

Valves of the above mentioned type are obviously already known and are commonly called degassing valves. They are one-way valves that are normally applied to the upper wall of the container and whose purpose is to allow the gases developed by the coffee to escape from the container - thus avoiding the possible build-up of internal overpressures which would cause swelling and/or breakage of the container itself - and at the same time to prevent air from entering the container as this would impair the quality of the product.

The one-way valves used at present serve this purpose perfectly, opening when slight internal overpressures occur and closing immediately when they cease.

However, these valves present great drawbacks due to the following considerations.

Fresh (newly packaged) coffee generates a mixture of gases inside the container, consisting mainly of carbon dioxide and, in a smaller percentage, of so-called aromas, which are characterised by complex molecular chains and thus high molecular weight.

The one-way valves currently used employ porous filters, whose sole purpose is to prevent the escape of coffee grains. In the event of overpressure inside the container, therefore, they allow both carbon dioxide and the product's aromas to escape through the valve.

The aim of the invention is to avoid this drawback and to preserve the aroma of the product virtually intact, preventing any escape of the aromas, i.e. of gaseous components with a long molecular chain.

This aim is achieved, according to the invention, by providing a degassing valve equipped with a selective filter, that allows the passage of molecules of carbon dioxide and any other gases, such as oxygen, nitrogen and methane, and traps the molecules that determine the product's aroma, which then fall back inside the container, thus enhancing the quality of the product.

Porous molecular separators or sieves can be used as selective filters. However, in the tests carried out it has been observed that the filters that best perform this selector function are compounds based on activated charcoal. This is presumably due to the fact that these activated charcoals, whether of the vegetable or natural type, are obtained through pyrolysis, a similar operation to that

which takes place during coffee roasting.

These activated charcoals can be used alone or mixed with other substances so as to accomplish more particular specific tasks, for example acid substances such as citric acid that neutralise basic gases or, vice versa, basic substances such as sodium hydroxide, that neutralize acid gases.

Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary, and therefore non-limiting embodiment, illustrated in the appended drawings, in which:

figure 1 is a schematic view of a degassing valve equipped with a selective filter according to the invention;

figure 2 is a schematic sectional view of the valve in figure 1 installed on a container, shown partially;

figure 3 is a schematic axonometric view of the container equipped with such a valve;

figure 4 is a schematic sectional view of a different embodiment of the valve filter.

With reference to these figures, in figure 3, the reference number 1 indicates generally a container for aromatic products, particularly coffee, of the flexible or semi-rigid type, for example of the type described in Italian patent application MI-91A001770.

In the example illustrated, at the top of the container there is a peelable diaphragm 2 that is removed on opening the container, which can then be closed again by means of a lid not shown in the figure.

The peel-off diaphragm 2 has a hole 3, beneath which is applied a degassing valve indicated as a whole by reference number 4, this valve being heat-welded or glued to the sheet 2.

The degassing valve 4, whose general structure can be considered substantially known, comprises a base plate 5 and a cap 6 seated in it. The cap 6 has an annular groove 7 near its lower edge that engages with a corresponding annular projection 8 provided on the bottom of the plate 5. Above the projection 8 a flat annular wall 9 is foreseen, which surrounds a central disk 10 provided with holes 11.

Between the cap 6 and the plate 5 is interposed a rubber diaphragm 12, acting as an actual valve, the peripheral part of which rests on said flat annular wall 9 of the plate, which is spread with a viscous or sticky layer 13, in order to provide a better seal. The diaphragm 12 is pressed against the plate 5 by a contrasting projection 14 provided in the top wall of the cap 6, in which an air-hole 15 is also provided.

The bottom of the plate 5 is shaped so that underneath it, below the disk 10, a housing 16 is provided for a filter 17 that will be described in

greater detail below.

The valve 4 is fixed to the sheet 2 by welding or gluing that follows an annular course 18 along the upper outside edge of the plate 5.

The valve works as follows.

Under normal conditions the rubber diaphragm 12 is pressed against the flat wall 9 of the plate 5 and, also thanks to the presence of the sticky or tacky layer 13, provides a seal both against the escape of the gases from inside the container 1 and against the entry of air from the outside.

In the event of overpressures inside the container 1, the diaphragm 12 lifts from the wall 9, allowing the gases to escape, passing into the outside environment through the holes 11, the space that is created between the diaphragm 12 and the wall 9, the hole 15 in the cap 6, and the hole 3 in the peel-off sheet 2. When normal conditions are restored, the diaphragm 12 comes down again, preventing air from entering the container by the opposite route to that previously described.

In order to prevent the coffee aromas from escaping too when gases are being discharged from the container, a selective type filter 17 is used.

In the preferred embodiment, illustrated in figs. 1 and 2, the filter 17 comprises two layers of porous paper 19, 20, between which is disposed an activated charcoal powder 21. The two layers of paper 19 and 20 are glued together along their outer edge, and the whole filter 17 can then be glued or heat-welded, along its peripheral edge 22, to the inside of the housing 16 of the plate 5. If the housing 16 has a slightly sloping side wall 23, so that its mouth is narrower, as shown in figures 1 and 2, the filter 17 is automatically retained inside the housing, without any need for further fixing means.

With this filter structure, the gases given off by the coffee, before passing through the rubber diaphragm (12), are filtered through the activated charcoal 21, which traps some of the gases, namely those with long molecular chains, thus absorbing and enriching itself with the aromas.

Once the coffee has stopped giving off gas, these aromas remain trapped at a high concentration in the activated charcoal.

Thus there is a very small volume (essentially that of the filter 17) with a high concentration of aromas, separated from the outside environment and in contact with the inside environment, i.e. the headspace 30 of the container 1, where the aromas are diluted at a lower concentration in the gas.

There will therefore be a pressure difference between the volume of the filter 17 and the headspace of the container, and to restore the pressure balance the gases trapped in the filter will subsequently flow back inside the container, enriching

the gas with the aromas which can also penetrate the coffee alveoli, thus increasing the concentration of these gases in the coffee, with clear advantages.

The activated charcoals 21 in the filter 17 can be mixed with other substances, for example acid substances such as citric acid that neutralize basic gases, or basic substances such as sodium hydroxide, which neutralize acid gases.

Figure 4 shows a different embodiment of the filter, indicated by 170, according to which it comprises a single sheet of porous paper 171, on which is spread at least one layer 172 of activated charcoal previously mixed with excipients such as water and sugar, for example.

Figure 4 shows a plurality of layers 172, each of which can perform specific functions, such as neutralising basic or acid gases, for example.

Obviously the valve according to the invention can be applied to flexible, air-tight bags or containers of any type to contain all those products which give off odours that must not be allowed to contaminate the outside environment.

Claims

1. A degassing valve for aromatic products, comprising a valve body (5, 6) and a valve element (12) of the one-way type, as well as a filter (17, 170) suitable for preventing the passage of product grains, characterised in that said filter (17, 170) is of the selective type, allowing the passage of gases with "simple" molecules, such as carbon dioxide, oxygen, nitrogen and methane and retaining gases that have complex molecular chains, and are therefore heavier, which constitute the product's aromas.
2. A valve according to claim 1, characterised in that said selective filter is a porous molecular sieve.
3. A valve according to claim 1, characterised in that said filter comprises activated charcoal (21), possibly mixed with other acid and/or basic substances.
4. A valve according to claim 3, characterised in that said activated charcoal (21) is of the natural or vegetable type.
5. A valve according to claim 3 or 4, characterised in that said active charcoal (21) is contained between two opposite layers of porous paper (19, 20).
6. A valve according to claim 3 or 4, characterised in that said activated charcoal is mixed with excipients, such as water and sugar, and

spread in one or more layers (172) on a sheet of porous paper (171).

7. A valve according to any one of the previous claims, characterised in that said filter (17, 170) is contained in a housing (16) created in said valve body (5). 5
8. A valve according to claim 1, in which said valve body comprises a base plate (5) housing said filter (17, 170) and a contrasting cap (6) provided with respective holes (11, 15), and said valve element (12) is a rubber diaphragm normally pressed against the plate (5) so as to close said holes (11). 10 15
9. A degassing valve according to any one of the previous claims, characterised in that it is applied to a wall of a container (1) for aromatic products, such as coffee and similar products that give off odours. 20
10. A valve according to claim 9, characterised in that it is applied to a peel-off sheet (2) that closes the container (1). 25
11. An air-tight container for products that develop fragrant gases, such as coffee and the like, equipped with a one-way degassing valve (4) provided with a selective filter, that prevents the escape of aromas or odours. 30

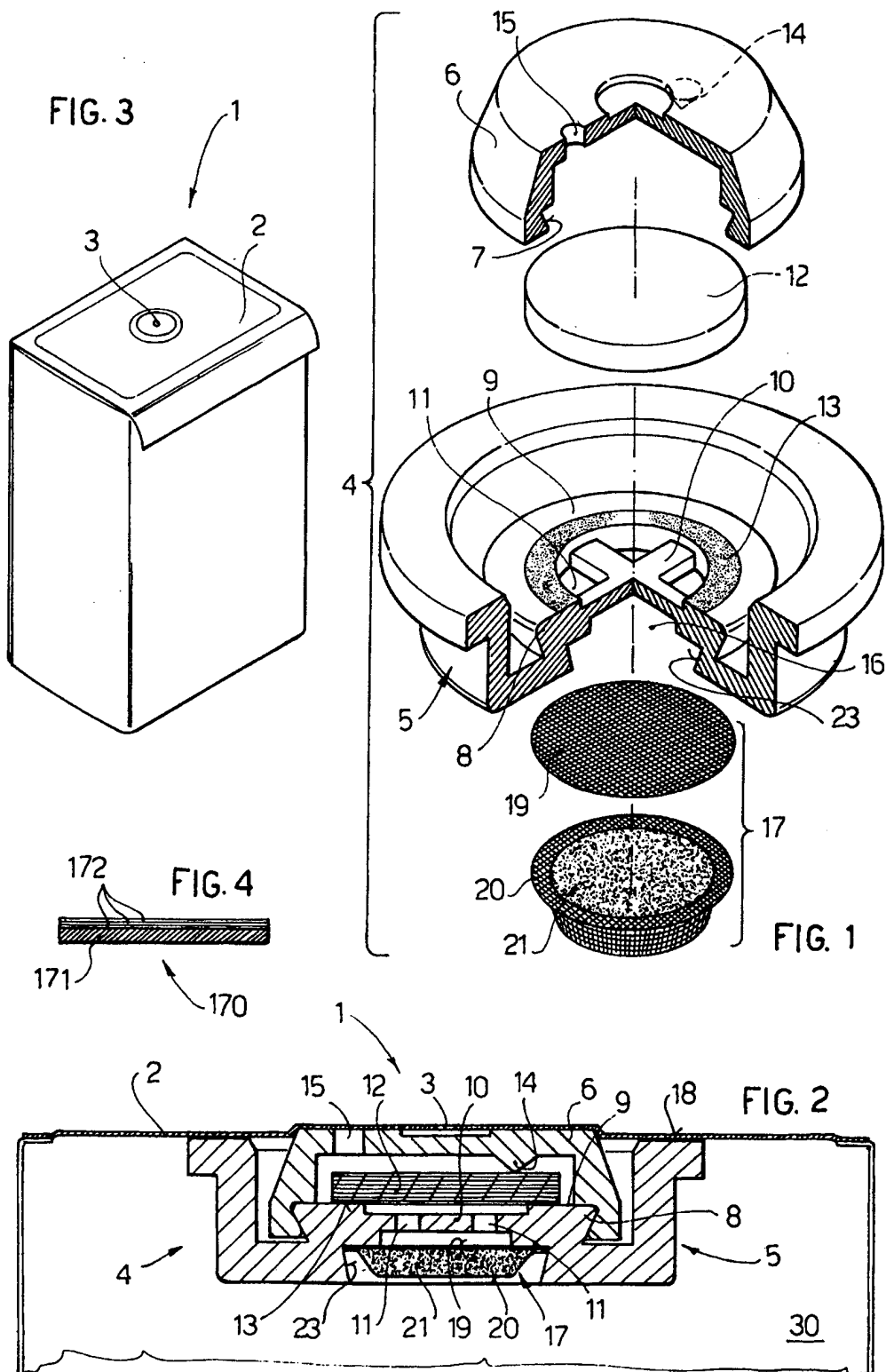
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European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 10 9525

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	US-A-3 243 071 (KIMMEL) * column 2, line 11 - column 3, line 55; figures 1-5 *	1-4,7,11 8,9	B65D77/22 B65D51/16
Y	FR-A-2 593 264 (VERDOL S.A.) * page 2, line 4 - page 3, line 9; figures 1-3 *	8,9	
A	EP-A-0 296 437 (MERCK PATENT GMBH) * column 3, line 38 - line 45; figure 1 *	1-4	
A	EP-A-0 373 833 (FLAVORCOFFEE CO. INC.) * column 5, line 6 - line 30; figures 1-4 *	1,8,9,11	
A	FR-A-2 233 232 (GOGLIO) * page 3, line 19 - page 4, line 27 *	8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 March 1995	Examiner Berrington, N
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			